Svetlana 4CX1500A Power Tetrode

The Svetlana 4CX1500A is a high-performance ceramic/metal, forced air-cooled, power tetrode designed for use in Class AB_1 or Class C RF amplifier service. It may also be used for audio frequency modulator, pulse modulator and DC power regulator service. The 4CX1500A filament is precision fabricated in a cylindrical mesh configuration for exceptional mechanical stability and long life.

The Svetlana 4CX1500A is manufactured in the Svetlana factory in St. Petersburg, Russia, and is designed to be a direct replacement for the 4CX1500A manufactured in the United States.

Svetlana SM
ELECTRON DEVICES

Svetlana 4CX1500A

General Characteristics

Electrical

Filament: Thoriated tungsten	
Voltage	*5.0 ± 0.25 V*
Current, at 5.0 volts	*38.5 ± 2.0 A*
Transconductance (Average):	
I_b = 1.0 Adc, E_{c2} = 500 Vdc	*26,000 µmhos*
Amplification factor (average):	
Grid to Screen	*5.5*
Direct interelectrode capacitance (grounded cathode):	
Input	*78 pF*
Output	*10.5 pF*
Feedback	*0.25 pF*
Frequency of maximum rating:	
CW	*150 MHz*

Mechanical

Cooling	*Forced air*
Base	*Ring and breechblock*
Recommended air system socket	*SK-831*
Recommended (air) chimney	*SK-806*
Operating position	*Axis vertical, base down or up*
Maximum operating temperature	*250°C*
Maximum dimensions:	
Length	*124.5 mm (4.9 in.)*
Diameter	*85.6 mm (3.37 in.)*
Net weight	*850 gm (30 oz.)*

Radio Frequency Linear Amplifier Class C (CW conditions)

Absolute maximum ratings

Plate voltage	*5000*	*Volts*
Screen voltage	*750*	*Volts*
Plate dissipation	*1500*	*Watts*
DC plate current	*1.0*	*Amps*
Screen dissipation	*75*	*Watts*
Grid dissipation	*25*	*Watts*

Typical Operation

Frequencies	***30 MHz*	***30 MHz*	****220 MHz*	
Plate voltage	*3000*	*4000*	*3000*	*Vdc*
Screen voltage	*500*	*500*	*500*	*Vdc*
Grid voltage	*-200*	*-200*	*-116*	*Vdc*
Plate current	*800*	*800*	*1000*	*mAdc*
Screen current	*36*	*37*	*35*	*mAdc*
Grid current	*17*	*15*	*0*	*mAdc*
Peak rf grid voltage	*240*	*240*		*Volts*
Calculated driving power	*4.1*	*3.6*	*31.5*	*Watts*
Plate input power	*2400*	*3200*	*3000*	*Watts*
Plate dissipation	*600*	*700*		*Watts*
Plate output power	*1800*	*2500*	*1500*	*Watts*
Resonant load impedance	*1720*	*2570*		*ohms*

**Approximate value **Calculated ***Measured*

Radio Frequency Linear Amplifier, Grid Driven, Class AB_1

Absolute maximum ratings

DC plate voltage	*4000*	*Volts*
DC screen voltage	*750*	*Volts*
Plate dissipation	*1500*	*Watts*
DC plate current	*1.0*	*Amps*
Screen dissipation	*75*	*Watts*
Grid dissipation	*25*	*Watts*

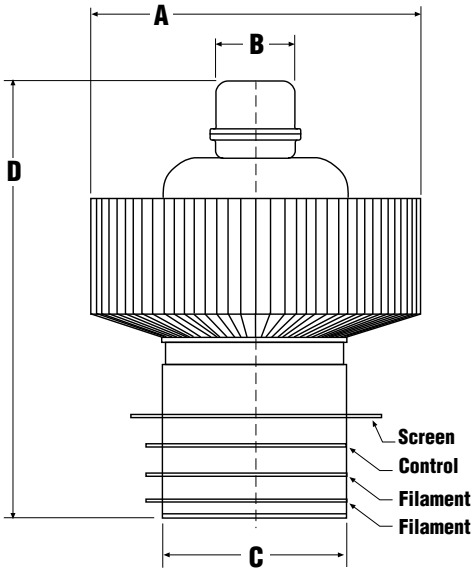
Typical Operation

(Frequencies to 30 MHz)			
Plate voltage	*2500*	*3900*	*Vdc*
Screen voltage	*600*	*600*	*Vdc*
Grid voltage	*-105*	*-110*	*Vdc*
Zero signal plate current	*250*	*200*	*mAdc*
Max signal plate current	*765*	*750*	*mAdc*
*Max signal screen current**	*46*	*40*	*mAdc*
Peak rf grid voltage	*95*	*100*	*Volts*
Peak driving power	*0*	*0*	*Watts*
Max signal plate dissipation	*820*	*1070*	*Watts*
Max signal useful output power	*1080*	*1850*	*Watts*
Resonant load impedance	*1670*	*2900*	*ohms*

**Approximate values*

Svetlana 4CX1500A

4CX1500A Outline Drawing



Dimensional Data				
Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	84.7	85.6	3.33	3.37
B	20.5	20.8	0.81	0.82
C	47.4	48.3	1.87	1.90
D	118.7	124.5	4.68	4.9

Electrical Application

Filament operation The rated filament voltage for the 4CX1500A is 5.0 volts. Filament voltage, as measured at the socket, should be maintained within ±5% of this value to obtain maximum tube life.

Grid operation The rated dissipation of the grid is 25 watts. This is approximately the product of DC grid current and peak positive grid voltage. Operation at bias and drive levels near those listed will insure safe operation.

Screen operation The power dissipated by the screen must not exceed 75 watts. Screen dissipation, in cases where there is no AC applied to the screen, is the simple product of the screen voltage and the screen current. If the screen voltage is modulated, the screen dissipation will depend on RMS screen current and voltage.

Screen dissipation is likely to rise to excessive values whten the plate voltage, bias voltage, or plate load are removed with filament and screen voltages applied. Suitable protective means must be provided to limit the screen dissipation to 75 watts in the event of a circuit failure.

Plate operation The plate dissipation rating of the 4CX1500A is 1500 watts. The tube and associated circuitry should be protected against surge current in the event of an arc with a current limiting resistance of 10 - 25 ohms in series with the lead from the power supply to the plate. The resistor should be capable of withstanding the surge current. It should not be used as a fuse.

Mechanical Application

Mounting The 4CX1500A must be operated with its axis vertical. The base of the tube may be down or up at the convenience of the equipment designer.

Socket The Svetlana 4CX1500A is designed for the SK-831 socket and SK-806 chimney. The use of recommended airflow rate through the socket provides effective forced-air cooling of the tube. Air forced into the bottom of the socket passes over the tube terminals through the Air Chimney and exits through the anode cooling fins.

Cooling The maximum temperature rating for the anode core and the metal/ceramic seals of the 4CX1500A is 250°C. Sufficient forced-air circulation must be provided to keep the temperature of the anode at the base of the cooling fins and the temperature of the ceramic/metal seals below 250°C. Air-flow requirements to maintain seal temperature at 225°C in 50°C ambient air are tabulated below (for operation below 30 MHz).

The blower selected in a given application must be capable of supplying the desired air flow at a back pressure equal to the pressure drop shown above plus any drop encountered in ducts and filters.

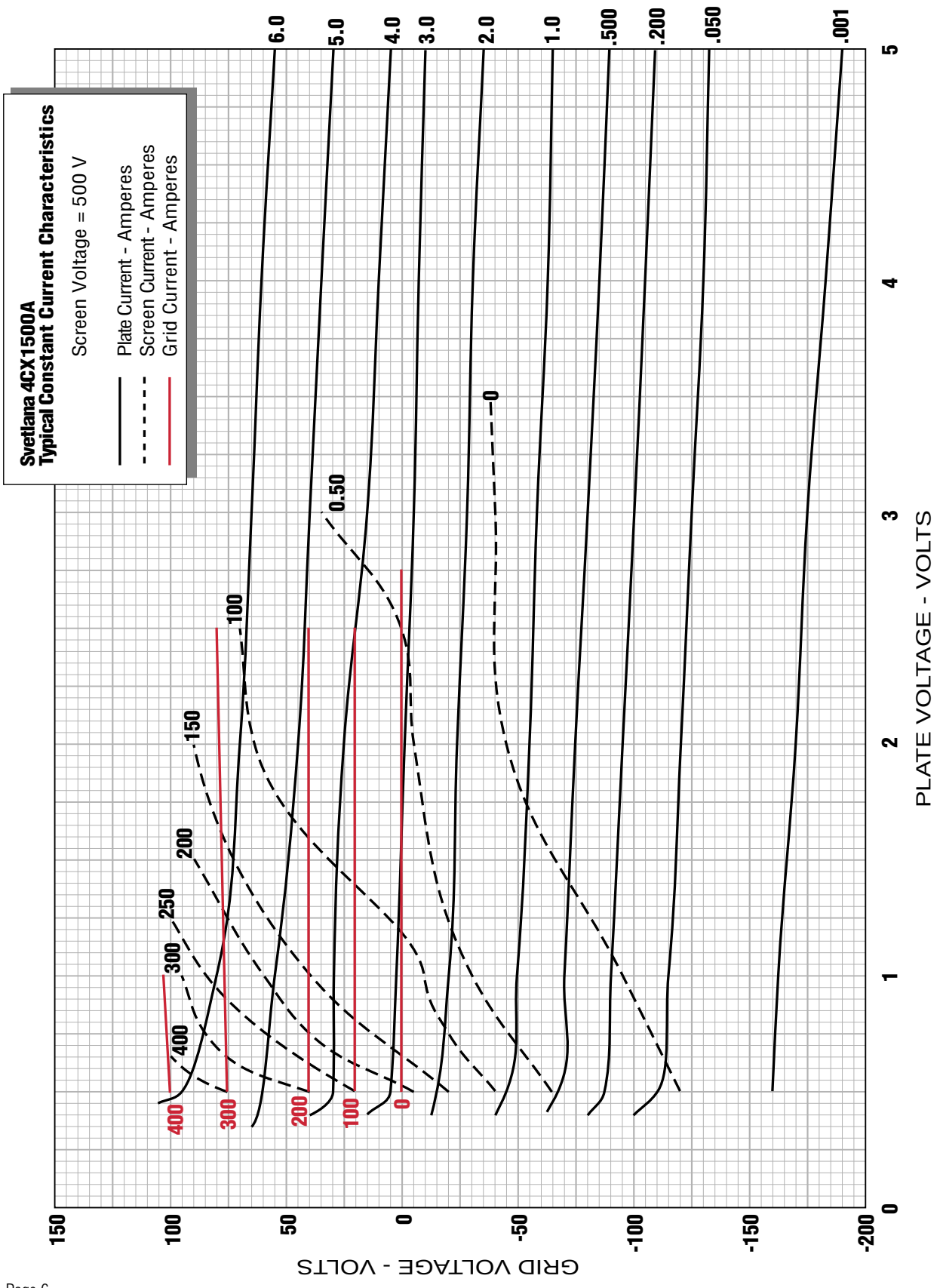
At other altitudes and ambient temperatures the flow rate must be modified to obtain equivalent cooling. The flow rate and corresponding pressure differential must be determined individually in such cases, using rated maximum temperatures as the criteria for satisfactory cooling.

Minimum Cooling Air-Flow Requirements

	Sea Level		6,000 feet	
Plate dissipation (watts)	Air flow (CFM)	Pressure drop (Inches of water)	Air Flow (CFM)	Pressure Drop (Inches of water)
1000	27	0.33	33	0.40
1550	47	0.76	58	.95

Since the power dissipated by the filament represents about 200 watts and since grid plus screen dissipation can, under some conditions, represent another 100 watts, allowance has been made in preparing this tabulation for an additional 300 watts dissipation.

Svetlana 4CX1500A



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